

REMARKS

The final Office Action dated January 24, 2006, has been reviewed carefully. Reconsideration of the rejections is respectfully requested on the basis of the above amendments and the following remarks. This Amendment is being filed in connection with a Request for Continued Examination.

The present invention provides an improved method and associated apparatus for identifying articles of interest by employing a plurality of RF antennas positioned on articles of interest, wherein each RF antenna has a non-linear element associated therewith and wherein each RF antenna is resonant at one of the plurality of different RF frequencies. RF energy of a first frequency is employed to interrogate one of the RF antennas. As a result of the non-linear element, the RF energy of a first frequency is converted into reflected RF energy of a different frequency from the first frequency. The reflected energy is sensed and, on the basis of the difference between the first frequency of the interrogating energy and the different frequency of the reflected RF energy, a determination is made as to which specific antenna is present on said article. These features are recited in amended independent method claim 1 and amended independent apparatus claim 15.

The present invention also provides a method and apparatus for monitoring an ambient physical condition such as temperature, pressure, humidity, chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, among others. In particular, an RF antenna has associated therewith a non-linear element whose response (i.e., the frequency it will reflect) depends on the physical property being monitored. RF energy of a first frequency is employed to interrogate the RF antenna. As a result of the non-linear element, the RF energy of a first frequency is converted into a reflected RF energy of a different frequency from the first frequency. Because the response of the non-linear element is dependent on the value of the property being monitored, the value of the different frequency

that is reflected will depend on and vary based upon the physical property being monitored. By comparing the reflected frequency to the transmitted first frequency, the level of or changes in the ambient physical property can be monitored. These features are recited in amended independent method claim 24 and amended independent apparatus claim 33.

CLAIMS 1-41 – SECTION 103(a)

Claims 1-41 were rejected on the basis of Augenblick in view of Greene.

Augenblick teaches a system where an antenna 20 radiates a signal of fundamental frequency F which is amplitude modulated by a modulating frequency f. A target 24 includes an antenna 26, a diode 28, and a reactive or frequency selective network 32 comprising a capacitor 34 and an inductor 36 connected across the diode 28. Col. 3, lines 1-17. The antenna 26 in each target 24 is resonant at the same fundamental frequency F. As a result, each target 24 will produce an output signal that includes a number of harmonics of the fundamental frequency F. In addition, due to network 32, each harmonic of the output signal will be surrounded by sidebands of the modulating frequency f (e.g., $2F \pm f$, $2F \pm 2f$, $2F \pm 3f$ and so on). The nature of the particular network 32 (i.e., the particular capacitor 34 and/or inductor 36 that is used) will determine the amplitudes of the sideband elements. It is the amplitudes of the received sideband elements that are used by the receiving unit 30 to identify the targets 24. Col. 4, lines 27-51. In other words, the receiving unit is able to differentiate among targets 24 that do not include a network 32 and/or among targets 24 that have differing networks 32 based on the received sideband elements. Thus, the system taught by Augenblick differs from the system recited in claims 1 and 15 because: (i) the antenna 26 of each target 24 is resonant at the same frequency, namely the fundamental frequency F, as opposed to each antenna being resonant at a different frequency (as recited in claims 1 and 15), and (ii) the amplitudes of the sidebands (which are based on the modulating frequency f

and not the fundamental frequency F) are used to determine which target is present, as opposed to the difference between a transmitted (interrogating) frequency and the reflected frequency being used to identify the antennas (as recited in claims 1 and 15).

Greene teaches a system wherein interrogating signals having certain frequencies are transmitted to a target that includes one or more resonators. Each of the resonators resonates at selected ones of the interrogating frequencies. The resonated frequencies are received by a receiver and are compared to the interrogating frequencies that were transmitted to determine which resonated frequencies, if any, match the interrogating frequencies (see Figure 8, col. 6, lines 17-34). Those frequencies that are the same are used to identify the particular target. Thus, Greene differs from system recited in claims 1 and 15 because it does not identify an antenna based on the difference between a transmitted frequency and the frequency reflected by the antenna. Instead, Greene relies on the identity between the transmitted and reflected frequencies to identify targets.

Thus, based on the differences described above, neither the Augenblick nor the Greene reference discloses all of the limitations of claims 1 and 15. In addition, as a result of these differences, the combination of Augenblick and Greene, as proposed by the Examiner, would similarly not include all of the limitations of claims 1 and 15. Specifically, that combination would not yield a system as recited in claims 1 and 15 wherein each RF antenna is resonant at one of the plurality of different RF frequencies and wherein on the basis of the difference between the first frequency of the interrogating energy and the different frequency of the reflected RF energy, a determination is made as to which specific antenna is present on said article. Accordingly, Applicants respectfully submit that claims 1 and 15 are allowable over the cited references. In addition, because claims 2-14 and 16-23 depend, directly or indirectly, from claims 1 and 15, they are likewise believed to be allowable over the cited references.

With regard to Claim 12, which recites a second non-linear element cooperating with the non-linear element to provide a variable readout as a function of a specific physical condition, it is respectfully submitted that Augenblick does not disclose a second non-linear element and, in fact, the additional elements of Augenblick, such as in Figures 7A, 8A and 9A, are linear elements necessary to produce the desired resonance in order for the device of Augenblick to function.

As noted elsewhere herein, independent claims 24 and 33, as amended, relate to a method and apparatus, respectively, for monitoring an ambient physical condition such as temperature, pressure, humidity, chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, among others. Claim 24 recites steps of “providing an antenna having a non-linear element whose response depends on the physical property being monitored,” “converting the interrogating RF energy into reflected RF energy of a different frequency … dependent on the physical property being monitored,” and determining the state of the physical property based on “a difference between said first frequency and said different frequency.” Similarly, claim 33 recites an apparatus including “a non-linear element operatively associated with said antenna whose response depends on the physical property being monitored,” “a detector for receiving reflected RF energy having a different frequency that is dependent on the physical property being monitored,” and “a processor for determining from a difference between said particular frequency and said different frequency the state of the physical property being monitored.” Neither the Augenblick nor the Greene reference discloses a method or apparatus for monitoring ambient physical conditions as recited in claims 24 and 33. Instead, as described in detail above, the systems described in Augenblick and Greene merely allow for determining whether a particular target is present based upon RF signals that they reflect (which signals are not ambient physical properties). No sensing of any ambient physical conditions, such as temperature, pressure, humidity,

chemical environment, light, pH, biological toxins, radiation, or mid stress-strain, or the like, is disclosed. Accordingly, Applicants respectfully submit that claims 24 and 33, as amended, are allowable over the cited references. In addition, because claims 25-32 and 34-41 depend, directly or indirectly, from claims 24 and 33, they are likewise believed to be allowable over the cited references.

With respect to dependent Claim 22, it is respectfully submitted that Augenblick does not disclose a second non-linear element cooperating with the non-linear element, but rather discloses a linear element.

With respect to claims 31 and 40, as noted above, there is no teaching of a second non-linear element in Augenblick.

SUMMARY AND CONCLUSION

It is respectfully submitted that the foregoing analysis establishes the fact that Applicants' independent claims 1, 15, 24 and 33 are patentably distinct from the applied art and that Claims 1-41 are in proper form for the issuance of a Notice of Allowance. Such action is respectfully requested at an early date.

Respectfully submitted,



Philip E. Levy
Attorney for Applicants
Registration Number 40,700

Telephone: 412-566-6043
E-mail: ipmail@eckertseamans.com